1. OVERVIEW

The Chicago-Northwest Indiana ozone nonattainment area[1] (nonattainment area) was classified as severe pursuant to Section 181(a) of the Clean Air Act, as amended in 1990 (Act or CAA). As a result of this classification, the States of Indiana and Illinois were subject to new requirements, including the development of a series of plans to reduce volatile organic compound (VOC) emissions and a plan demonstrating that the area would meet the federal one-hour air quality standard for the pollutant ozone (ozone standard)[2] by November 2007.

Since 1990, significant progress has been made in the nonattainment area towards achieving attainment of the ozone standard. Several new programs and new or amended rules have been implemented to reduce local and region-wide VOC emissions. Both the frequency and severity of exceedances of one-hour ozone levels have decreased significantly in the past decade.

This document represents the ozone standard attainment demonstration for the Indiana portion of the nonattainment area. In accordance with U.S. Environmental Protection Agency (US EPA) guidance, this document demonstrates that, with the combination of current and proposed clean air measures and the implementation of regional measures to address the problem of transported pollution, air quality will meet the ozone standard by November 15, 2007.

Because the Chicago ozone nonattainment area is multi-state, the CAA requires the attainment demonstration for ozone to be based on photochemical grid modeling. A computer model is used to predict maximum ozone concentrations in every grid cell (or point of analysis) within the nonattainment area. The benchmark for attainment is that the predicted maximum ozone concentration in every grid cell is below the federal ozone standard.

In the event that attainment cannot be predicted in every grid cell, states may use a statistical approach to support the attainment demonstration. This approach includes three benchmark tests that focus on the number and magnitude of simulated exceedances. If one or more of the benchmark tests is not met, then States may rely on a "weight of evidence" demonstration. A weight of evidence demonstration relies on the use of supplemental information, such as air quality and emission trends, to support the modeling analysis when making a demonstration that the nonattainment area will comply with the ozone standard. A relative reduction factor is calculated that determines the percentage difference between the modeled basecase and the modeled attainment strategy. That percentage is applied to the current design value to project future ozone concentrations. This demonstration, along with an identified set of control measures, can be used to support expectations that air quality in the area will meet the ozone standard by the prescribed attainment date.

[1] The Chicago-Gary-Lake County severe ozone nonattainment area contains Lake and Porter Counties in Indiana, as well Cook, DuPage, Grundy, Kane, Kendall, Lake, McHenry, and Will Counties in Illinois. This document focuses on the Indiana portion of the nonattainment area.

[2] The federal one-hour air quality standard for ozone (also known as the National Ambient Air Quality Standard, or NAAQS, is 0.12 parts per million (ppm)). According to US EPA guidance, any monitored value 0.125 ppm (125 parts per billion [ppb]) or greater is considered an exceedance of the ozone standard. An average of no more than one exceedance per year at each monitor over a three-year period is considered attainment of the standard.

A state-of-the-art modeling analysis, plus supplemental weight of evidence information, was performed to support the final one-hour ozone attainment demonstration. The variable-grid Urban Airshed Model, version 1.24 (UAM-V) was used for the analysis. On December 15, 1994, US EPA determined that the model was "…performing in an acceptable manner and may be used for regulatory purposes". The final attainment modeling strategy consists of four sets of controls:

- Federal Clean Air Act controls,
- State rate-of-progress emission reduction plans,
- Federal Tier II/Low Sulfur program, and
- Regional NO_x reductions.

The modeling shows that these controls are sufficient to provide for attainment of the ozone standard in the Lake Michigan area. The modeling domain includes the areas of high concentrations around Lake Michigan and possible upwind source areas impacting these high concentration areas.

Federal Clean Air Act controls, state Rate of Progress plans, and the Tier II/Low Sulfur program have been or are currently being implemented. The last set of controls, the regional NO_x reductions, were identified in 1998 as a necessary step toward attainment of the ozone standard nationally by the Ozone Transport Assessment Group (OTAG), an organization of thirty-seven (37) eastern and midwestern states, US EPA, and many other public and private entities. Work completed by OTAG suggested that controlling electric utility system boilers and large industrial boilers would reduce regional ozone transport and assist with attainment of the ozone standard in the nonattainment area. Technical work performed by Indiana also supported this conclusion. Regional NO_x control rules are being adopted by the Lake Michigan States, including Indiana.

The elements included in this plan provide the technical analysis necessary to support a demonstration that the air quality in the nonattainment area will meet the ozone standard by the attainment date. This document includes elements that:

- Achieve the federally mandated rate-of-progress (ROP) deadlines for reducing VOC and NO_x emissions in the milestone years of 2002, 2005, and 2007;
- Establish VOC and NO_x emission budgets for stationary, mobile and area sources in 2002, 2005, and 2007; and,
- Demonstrate improved air quality sufficient to attain the ozone standard by 2007.

2. BACKGROUND

Historically, exceedances of the ozone standard have been monitored in counties located in Illinois, Wisconsin, western Michigan, and Lake and Porter Counties located in northwest Indiana. Recognizing the need for a regional solution, the four Lake Michigan States, Indiana, Illinois, Michigan, and Wisconsin began to work together in 1988 on the ozone problem. The four states and US EPA formed the Lake Michigan Air Directors Consortium (LADCO), to provide a platform for regional air quality assessment and establish a technically credible modeling system for the lower Lake Michigan area. Under the Clean Air Act (CAA), as

amended in 1990, the counties comprising the Chicago consolidated metropolitan statistical area were designated as an ozone nonattainment area and classified as severe nonattainment of the ozone standard. As a result of this classification, Section 182(d) of the CAA set forth new requirements for Indiana's, Illinois, and Wisconsin's State Implementation Plans (SIPs).

The agencies responsible for assuring the Chicago nonattainment area complies with CAA requirements are:

- The Illinois Environmental Protection Agency (IL EPA),
- Wisconsin's Department of Natural Resources (WDNR), and
- The Indiana Department of Environmental Management (IDEM).

The three states have worked cooperatively with each other and US EPA Region V to address attainment planning issues[3].

Although the three agencies have worked together on the comprehensive attainment demonstration for the multi-state nonattainment area, each State is required to make a separate submittal for its portion of the planning area to US EPA. Rate of Progress (ROP) plans and attainment demonstrations are SIP submittals and US EPA takes action on them separately.

Section 182(d) of the CAA specifies the different requirements that apply to severe ozone nonattainment areas. Also, because the Chicago ozone nonattainment area includes portions of several states, Section 182(j) of the CAA adds additional requirements. The CAA specifies the following requirements:

- A Fifteen Percent (15%) Volatile Organic Compound (VOC) Emission Reduction Plan, also known as a "rate-of-progress plan", or ROP;
- Reasonable further progress plans for 1999, 2002, 2005, and 2007;
- An enhanced vehicle inspection and maintenance program;
- VOC reasonably available control technology (RACT) requirements;
- Nitrogen oxides (NO_x) reasonably available control technology requirements[4];
- All fully-adopted rules beyond those in the ROP plan needed to show attainment by the November 2007 deadline;
- Clean-fuel vehicle programs;

[3] Although several counties within the state of Michigan were originally included in the nonattainment designation, they now meet the 1-hour ozone standard and are no longer required to submit an attainment demonstration.

[4] The Lake Michigan States petitioned and were granted a waiver from certain NOx control requirements of the 1990 amendments (61 FR 2428). The request was based on modeling that showed NOx reductions in the nonattainment area would actually increase ozone levels, but the States indicated that they would continue to evaluate the effects of NOx reductions and, ultimately, implement controls if they were determined necessary and appropriate for the ozone plan. US EPA granted the waiver on a contingent basis. In the notice of final rulemaking on the waiver, US EPA stated that it expected the Lake Michigan States to incorporate OTAG modeling results and control recommendations in the development of attainment plans. US EPA further indicated its intent to review these attainment plans, and the associated modeling, to determine if the waiver should be continued, altered, or removed. In light of the NOx controls for certain sources included in this final 1-hour attainment demonstration, the waiver is now moot for these sources.

- Transportation control strategies and measures to offset any growth in vehicle emissions; and
- An attainment demonstration based upon photochemical grid modeling.

These components were originally due November 15, 1994. However, a September 1, 1994, US EPA policy memorandum, *November 1994 Submittal Policy*[5], acknowledged that, due to overwhelming transport of pollutants and ozone precursors from upwind areas, completion of the required photochemical grid modeling demonstrating attainment for many ozone nonattainment areas would not be possible by the November 15, 1994 deadline. US EPA stipulated that the states submit an attainment demonstration by the November 15, 1994, deadline, consult with other states regarding the transport issue, and then supplement the attainment demonstration based on the outcome of those discussions.

In a subsequent memorandum, dated March 2, 1995[6], US EPA provided States with serious and severe ozone nonattainment areas until mid-1997 to submit attainment demonstration SIPs, on condition that the states participate in the Ozone Transport Assessment Group (OTAG) effort to review and complete the assessment of transported ozone and precursors, and complete local area modeling.

Indiana and the other Lake Michigan states were able to develop and implement their 15% Plans as required by Section 182(b)(1). However, despite significant efforts on the part of Indiana and other affected states in the eastern United States, the modeling analyses determined significant reductions in both local ozone precursor emissions and transported ozone and ozone precursor concentrations would be necessary to attain the ozone standard. No state was able to submit a full attainment plan by the November 1994 deadline as prescribed in Section 182(c)(2)(A) of the CAA.

More recently, in a memorandum signed by Richard Wilson in December 1997[7], EPA provided additional time, indicating that States should submit, among other things, a modeling demonstration by April 1998 and final adopted regulations by December 2000 (for ozone nonattainment areas classified as severe). Indiana submitted the required modeling demonstration in April 1998. This document contains the final modeling analysis and rules required by December 2000.

2.1 Phase I Submittal

Recognizing the transport problem, US EPA established a two-phase approach for States to complete their attainment plans. In the policy memorandum dated March 2, 1995, and signed by Mary Nichols, US EPA outlined the major elements of this process. The policy memorandum recognized the efforts made by states and the remaining difficulties they were facing in making the rate-of-progress and attainment demonstration SIP submittals. The policy memorandum detailed the process for fulfilling the requirements of the two-phased approach. Phase I required states with serious and above nonattainment areas to submit the following items:

[5] A copy of the policy memorandum, *November 1994 Submittal Policy*, is included as Appendix A.
[6] A copy of the memorandum, *Ozone Attainment Demonstrations*, issued March 2, 1995, may be found on US EPA's web site at http://www.epa.gov/ttn/oarpg/t1pgm.html.
[7] A copy of the memorandum, *Guidance for Implementing the 1-Hour Ozone and Pre-Existing PM10 NAAQS*, issued in December 1997, is included as Appendix B.

- By November 15, 1994, interim attainment demonstrations that included photochemical modeling, based on assumed boundary conditions, to show that the control measures selected would bring the area into attainment;
- A 15% ROP plan which reduced ozone precursors 15-percent by 1996 ;
- A 1999 Rate-of-Progress plan, which achieved the next three-year increment or an additional nine percent of reduction of VOC emissions from 1990 levels; and
- An enforceable commitment to participate in a consultative process to address regional transport of ozone, adopt additional control measures as needed, and identify required upwind reductions to achieve attainment. Also, as part of the commitment, States were to include a schedule for completing adoption of any additional rules.

The Indiana Department of Environmental Management (IDEM) had submitted its final 15% ROP Plan on December 5, 1996, which was approved by US EPA on July 18, 1997 (62 FR 38457). IDEM submitted the additional requirements of its Phase I plan to US EPA in two separate actions:

- On August 19, 1997, IDEM submitted a SIP revision committing to follow the two-phased approach detailed by Mary Nichols' memorandum (Appendix C). The submittal contained the photochemical grid assessment modeling completed to date which indicated attainment, based upon assumed changes to boundary conditions. IDEM also committed to following the remaining requirements for demonstrating attainment that were detailed in the memo; and,
- The last of the Phase I requirements was met when IDEM submitted the "1999 9% VOC Reduction Plan for Lake and Porter Counties" (Appendix D) on December 17, 1997[8].

The submittals made to US EPA and the actions taken on them through the Phase I submittal are detailed in Table 2.1.

2.2 OTAG Process / Phase II Submittal

Phase II called for a two-year consultative process to assess national and regional strategies to address ozone transport in the eastern United States, and subsequent revisions of local control plans, as necessary, based on any new national or regional strategies.

To accomplish the Phase II consultative process, the Environmental Council of the States (ECOS), in conjunction with US EPA, established the Ozone Transport Assessment Group (OTAG). The goal of OTAG was to identify and recommend a strategy to reduce transported ozone and its precursors which, in conjunction with other measures, would enable attainment and maintenance of the ozone standard in the OTAG region.

Through the 2-year OTAG effort, US EPA worked in partnership with 37 eastern and midwestern States and the District of Columbia, industry representatives, and environmental groups to develop strategies to address transport of ozone-forming pollutants across state boundaries. The OTAG study area included the Lake Michigan nonattainment area. Indiana and the other Lake Michigan States actively participated in the OTAG process, with LADCO serving as one of the main modeling centers for the technical work.

[8] US EPA Region V found the submittal administratively complete on December 30, 1997, and issued a final approval on January 26, 2000 (65 FR 2146).

In June 1997, OTAG concluded and provided US EPA with recommendations regarding ozone transport. OTAG generally concluded that transport of ozone and the precursor NO_x is significant and would need to be reduced regionally to enable States in the eastern half of the country to attain the ozone standard. In recognition of the length of the OTAG process, in a December 29, 1997, US EPA memo (see Appendix B), signed by Richard Wilson, US EPA's then Acting Assistant Administrator for Air and Radiation, provided States until April 1998 to submit the following elements of their attainment demonstration SIPs:

- Evidence that all measures and regulations required for the nonattainment area had been adopted and implemented;
- A list of measures and regulations needed to meet Rate-of-Progress requirements and attain the ozone standard;
- A commitment to completing the post-1999 Rate-of-Progress plans, including calculations of the post-1999 target levels and adoption of all necessary control measures;
- Evidence of a public hearing; and
- Updated modeling analysis and supporting documentation.

This submission, based on a commitment to identify and adopt the measures needed for attainment, was considered to be the Phase II submittal. Indiana provided US EPA with its Phase II submittal on April 30, 1998 (Appendix E), as detailed in Table 2.1.

On December 16, 1999 (64 FR 70514), US EPA proposed to conditionally approve Indiana's Phase II SIP, as well as those submitted by Illinois and Wisconsin (64 FR 70496 and 64 FR 70531, respectively). The approval was based on the April 1998 modeling analysis submittal and Indiana's commitments to adopt and submit a final ozone attainment demonstration SIP and post-1999 ROP plans, including the necessary State air pollution control regulations to complete the attainment demonstration and ROP plans, by December 31, 2000.

2.3 NO_x SIP Call

The primary strategy for ozone attainment identified by OTAG was region-wide NO_x emission reductions from stationary sources. Building upon the OTAG recommendations and technical analyses, US EPA proposed to address the ozone transport problem, on November 17, 1997. In its proposal, US EPA found that current SIPs in 22 States and the District of Columbia were insufficient to provide for attainment and maintenance of the ozone standard because they did not regulate NO_x emissions that significantly contribute to ozone transport (62 FR 60318). US EPA finalized that rule in September 1998, calling on the 23 jurisdictions to revise their SIPs, by September 1999, to require NO_x emissions reductions within each State to a level consistent with a NO_x emissions budget identified in the final rule (63 FR 57356). These States were required to submit a revision to their SIPs addressing the regional transport of ozone, consisting of rules to reduce NO_x emissions from electric utility boilers, cement kilns, large industrial boilers, and stationary internal combustion engines.

On May 14, 1999, in response to a lawsuit filed by the utilities and multiple states affected by the NO_x SIP Call, including Indiana, the US D.C. Circuit Court of Appeals issued a stay of the September 1999 deadline for states to submit their NO_x rules. This was not a ruling on the merits of the NO_x SIP Call, but a delay until the Court could consider the substantive arguments

raised by the parties. On March 3, 2000, the Court largely upheld the rule, with certain exceptions, and on June 23, 2000 it lifted the stay, giving states until October 28, 2000 to submit compliant rules to US EPA.

Table 2.1

Clean Air Act Submittals			
Submittal	Date of Submittal	Date Approved	Federal Register Cite
15% Rate of Progress Plan	June 26, 1995 July 13, 1997	July 18, 1997	62 FR 38457
Phase I Commitment Submittal	August 19, 1997	N/A	N/A
1999 9% Rate of Progress Plan	December 17, 1997	January 26, 2000	65 FR 4126
Phase II Submittal - Interim Attainment Demonstration	April 30, 1998	December 16, 1999 (conditionally approved)	64 FR 70514
Final Attainment Demonstration	This submittal		
2002 9% Rate of Progress Plan	Included as part of this document		
2005 9% Rate of Progress Plan	Included as part of this document		
2007 6% Rate of Progress	Included as part of this document		

The remaining sections of this document detail the necessary control measures, outline the final modeling strategies, and summarize the technical analysis to support this one-hour ozone attainment demonstration.

It is important to reiterate that this final plan addresses the one-hour ozone standard, not the eight-hour ozone standard that was promulgated by US EPA in 1997 and has been the subject of a legal challenge. Any future planning for attainment of the eight-hour ozone standard is dependent upon the outcome of that lawsuit and is independent of planning efforts focused on the one-hour ozone standard.

3. CONTROL MEASURES

3.1 VOC Control Measures

A. Previously Required Rate of Progress Plans

By December 2000, Indiana is required to submit to US EPA revisions to its State Implementation Plan (SIP) that will result in the attainment of the ozone standard in Northwest Indiana. These SIP revisions, and their associated rules and programs, represent the third phase of a series of attainment demonstration submittals developed to address the one-hour ozone problem in Lake and Porter Counties.

As part of Indiana's Phase I submittal, IDEM adopted a series of VOC emission reduction measures to improve air quality in Northwest Indiana and to meet VOC control targets required by the 1990 Clean Air Act Amendments. Those measures are detailed below. Further reductions of VOC and NO_x emissions must be pursued as required and committed to in the Phase II submittal. The level of VOC and NO_x emissions that must be achieved in 2002, 2005, and 2007 and measures for achieving those levels for the stationary, area, and mobile source categories are also included in this section.

Fifteen Percent Rate of Progress Plan

The first SIP requirement established by the 1990 CAA Amendments was the development of a plan to reduce VOC emissions by 15% from 1990 level emissions, due by November 15, 1993. The 15% in emission reductions must be calculated from 1990 baseline emissions and must account for any net growth in emissions. This requirement is referred to as the 15% Rate of Progress Plan (ROP).

Indiana's final 15% ROP plan was approved by US EPA on July 18, 1997 (62 FR 38457). The plan consisted of five federally mandated controls and three additional non-mandatory measures. The measures consisted of a mix of point, area, and mobile source control measures, including:

- An enhanced vehicle inspection and maintenance program,
- Stage II vapor recovery controls,
- Reformulated gasoline program,
- A Federal Architectural and Industrial Maintenance Coatings Rule,
- Residential open burning ban,
- A State rule controlling VOC emissions from miscellaneous industrial sources (known as the non-CTG RACT rule), and
- The required closure of certain coke oven batteries at Inland Steel Flat Products.

The total amount of VOC emission reductions achieved due to the implementation of these measures, as part of the 15% ROP plan, was 68,130 pounds per summer day.

9-Percent Rate of Progress Plan through 1999

The Clean Air Act Amendments of 1990 required areas with air quality that does not meet health standards for ozone to make ***continuing*** progress to reduce emissions of pollutants that contribute ozone formation. The 1999 Rate of Progress (ROP) plan, which built upon the reductions that were included in the *1996 Lake and Porter 15% VOC Reduction Plan*, represented continued progress toward cleaner air for northwest Indiana. This plan provided an average reduction in VOC emissions, from 1990 adjusted base year emission levels, accounting for growth, of three percent per year over the three-year period from 1996 to 1999, for a total of nine percent. Indiana's plan for an additional nine percent reduction in VOC emissions was submitted to US EPA on December 17, 1997, and it was found complete by US EPA Region V on December 30, 1997.

Indiana's 1999 ROP plan included several federal regulations as well as measures specific to Indiana, including state rules and negotiated agreements with several large industrial sources. The nine percent reduction in VOC emissions was based upon the 1990 emissions inventory, with adjustments for area growth and controls applied by the 15% Plan.

The reductions included a variety of measures that affected various industrial and area sources, such as steel mills, small engines (e.g., lawnmowers), gasoline reformulation, and personal solvent usage. The measures included the following:

- The National Emission Standards for Benzene from Coke Oven By-Product Recovery Plants,
- National Emission Standards for Coke Oven Batteries,
- Effects of reformulated gasoline on small engines,
- Small engine standards,
- Commercial/Consumer Solvent Reformulation,
- Controls on Volatile Organic Liquid Storage facilities, and
- Coke oven battery shutdown at Inland Steel.

The total amount of VOC emission reductions achieved due to the implementation of these measures, as part of the 1999 9% ROP plan, was an additional 77,660 pounds per summer day.

Table 3.1

Rate-of-Progress Requirements for 1996 and 1999		
	1996	1999
Emission Reductions Needed	68,130 lbs/day	77,364 lbs/day
VOC Emission Reductions Obtained in ROP plan	68,242 lbs/day	77,660 lbs/day
Overall Reduction Required from Base Year (1990)	15%	24%

Contingency Measures

The Clean Air Act requires that rate-of-progress plans contain measures that would be implemented if the measures contained within those plans do not achieve their expected reductions. Indiana has and will continue to use control measures that are already implemented, but not required, for reaching the stated reduction percentage of each plan, to meet the contingency measure requirement. If a contingency measure is required to fulfill the reduction requirement for one of the rate-of-progress plans, another measure may be required to ensure that the three-percent contingency measure requirement is fulfilled.

B. Rate of Progress Plans Required as Part of this Demonstration

9% Rate of Progress Plans through Attainment Year (post 1999)

Additional measures to reduce emissions of ozone-causing pollutants will be required as part of future Rate of Progress Plans in order to achieve the 2007 attainment date for the one-hour ozone standard. The Post 1999 Rate of Progress Plans, for milestone years 2002, 2005, and 2007, are included as Appendix F.

3.2 NO_x Reductions

Work completed by the Ozone Transport Assessment Group (OTAG) indicated that reducing NO_x emissions from electric utility system boilers and large industrial boilers would reduce ozone formation and transport and would be the most cost-effective clean air strategy, given the substantial VOC reductions that had already been achieved in nonattainment areas. Recent technical evaluations, conducted by the LADCO states, of various options for attaining the ozone

standard indicate a need to focus emission control efforts on large NO_x sources as well as VOC sources. Technical work done by Indiana also supports this conclusion.

Numerous VOC control measures to control locally emitted pollutants have already been implemented Lake and Porter Counties, as discussed above. Indiana has determined that regional NO_x reductions are also necessary for Lake and Porter Counties to attain the ozone standard and to lessen any significant transport of ozone and ozone precursors from Indiana to neighboring states. NO_x reductions are a cost-effective and equitable strategy, given that electricity is consumed by all sectors of the economy.

A. State NO_x Rule

Faced with the NO_x SIP Call stay and the SIP Call's uncertain legal status, in the fall of 1999, Indiana decided to proceed with the development of a NO_x control rule that would require emission reductions necessary to achieve attainment of the ozone standard in Lake and Porter Counties, as well as Clark and Floyd Counties, Indiana's other ozone nonattainment area.

Indiana's proposed rule requires stringent emission limits for electric utility system boilers and large industrial boilers. Controls for the additional source categories proposed in the NO_x SIP Call are not included in the proposed state rule.

The proposed state rule would require that, beginning in 2003, electric utilities meet an emission rate of twenty-five hundredths (0.25) pound of NO_x per million Btu during the ozone season (May 1 through September 30). Industrial boilers must meet a NO_x emission rate specific to the boiler type and fuel usage (ranging from four-tenths (0.4) to two-tenths (0.2) pound of NO_x per million Btus). IDEM has calculated that this rule will result in the statewide reduction of sixty-five thousand six hundred thirty-one (65,631) tons of NO_x emissions by 2007, even with growth assumed for the affected sources.

Indiana's draft proposal was preliminarily adopted by the Air Pollution Control Board on August 2, 2000, and final adoption is scheduled for December 6, 2000 (Appendix G).

B. NO_x SIP Call

The NO_x SIP call requires electric utility boilers, large industrial boilers, cement kilns, and stationary internal combustion engines, within Indiana, to reduce emissions by one hundred sixteen thousand four hundred sixty-three (116,463) tons by 2007. The rule is intended to reduce the transport of ozone and ozone causing pollutants that occurs in the OTAG multi-state region.

IDEM will submit a status letter to US EPA by October 30, 2000. The letter, along with a copy of the "First Notice of Rulemaking" published in the *Indiana Register* on July 1, 2000, will confirm that Indiana began a rulemaking to meet the requirements of the NO_x SIP Call[9]. It will also state that the rule is expected to be fully adopted by mid-2001.

[9] The final version of this Attainment Demonstration will update this section. A copy of the status letter to US EPA and a copy of the "First Notice of Rulemaking" will be included as Appendix H.

Recent events have created further uncertainty about the timing and nature of NO_x reductions both in Indiana and the states affected by the NO_x SIP Call. On August 30, 2000, the DC Circuit Court of Appeals postponed the compliance date of the NO_x SIP Call from May 1, 2003 to May 31, 2004. It is uncertain whether there will be further appeals of the ruling that upheld the SIP Call. The proposed state rule would require compliance by May 1, 2003, because it was consistent with the NOx SIP Call compliance date at the time and it was the attainment date established by US EPA for Clark and Floyd Counties. Indiana is proceeding forward with both the state rule and the NO_x SIP Call rule at this time, but acknowledges that either rule, along with comparable reductions by other states, would bring the Indiana nonattainment counties into attainment, as demonstrated by the LADCO modeling.

4. TECHNICAL ANALYSIS

Much of the following discussion is based upon findings in the LADCO Technical Support Document. This document is in three parts, Appendix I – The Executive Summary, Appendix J – 1-Hour Attainment Demonstration for Lake Michigan Area, and Appendix K – Emissions Inventory. The Executive Summary provides a brief overview of the history of the modeling, episode days selected, strategies modeled, and results. The 1-Hour Attainment Demonstration gives in-depth modeling information regarding the modeling, performance statistics, discussion of strategies and results, and the attainment demonstration. The Emissions Inventory discusses the 1996 base emissions information, 2007 projected emissions, and the quality assurance activities.

4.1 Air Quality Analysis

For both the inventory and air quality discussions, Lake, Porter, and LaPorte Counties in Indiana are categorized as the "Northwest Indiana" area because of similar industries and location along the shores of Lake Michigan. LaPorte County has had the highest design value[10] in Indiana the past several years, although it is not part of the designated nonattainment area.

Ozone values in the Chicago / Milwaukee / Northwest Indiana area during the 1980s were high enough that it was classified as severe nonattainment by the 1990 Clean Air Act Amendments. The original design value for this area, based upon 1987 to 1989 data, was 190 ppb at a site north of Chicago. The highest design value in Indiana, during the same timeframe, was 158 ppb, in Gary. With the implementation of the control measures described earlier in this document, the air quality has improved greatly. Even though the number of monitoring sites has increased, the number of exceedances, the number of sites with exceedances, and peak values have declined. Charts showing the numbers of exceedances in the area are shown in Appendix J, Figure 27. A map of exceedance sites in 1987-1989 compared to 1997-1999 is in Appendix J, Figure 28. These charts illustrate a close relationship between high ozone concentrations and "hot" days,

[10] The design value is calculated using US EPA guidance. It is the fourth highest monitored value measured over three years. It is calculated this way because the standard allows one exceedance for each year.

those reaching temperatures of 90 degrees and over. They also show over this time period that the number of exceedances has decreased on hot days.

At this time, Indiana does not have any sites with a design value over 116 ppb. However, as can be seen in Chart 4.1 below, exceedances continue to occur within the nonattainment area. Sheboygan, Wisconsin has the highest design value in the area, and Michigan City, the highest value in Indiana. Table 4.1 at the end of this chapter shows the exceedances in the Lake Michigan area since 1995 and design values of sites over 125 ppb. Table 4.3 is an AIRS report showing monitored ozone data from Northwest Indiana since 1990.

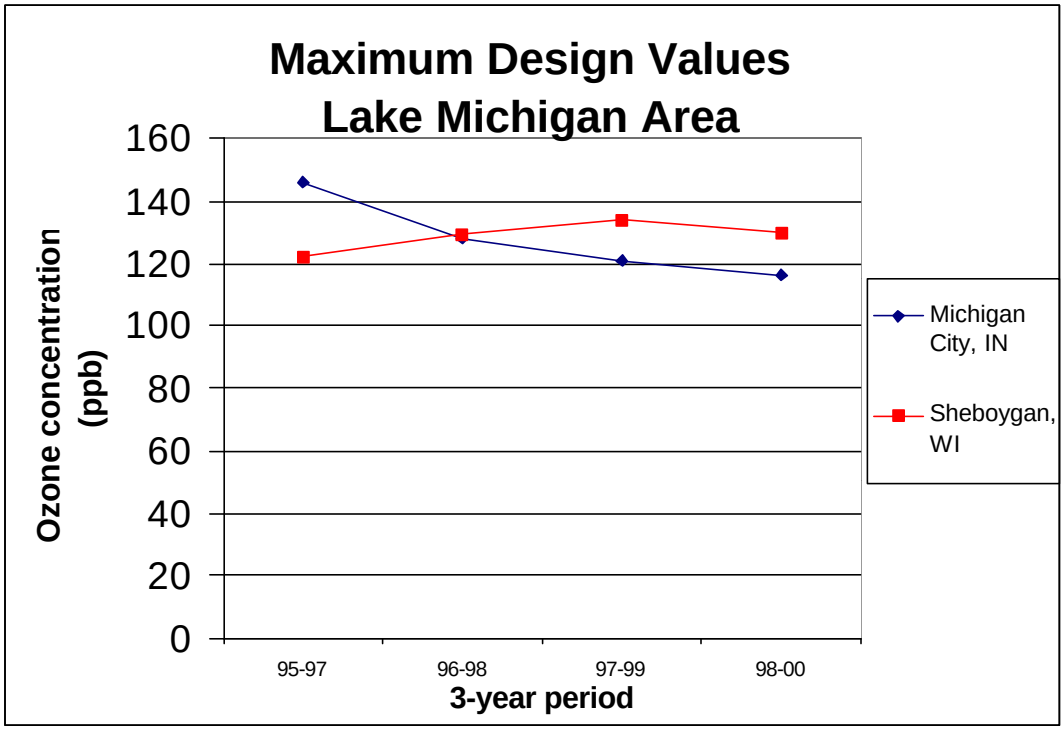


Chart 4.1

4.2 Emission Inventory Analysis

Northwest Indiana is a heavily industrialized area, with emissions from steel mills, electrical generating utilities, and a refinery dominating the point source categories. A large population and the presence of several major interstates and toll roads also contribute a large amount of VOC and NO_x emissions from motor vehicles and area sources. Charts 4.2a and 4.2b illustrate the distribution of these emissions categories to the overall inventory for 1996, the last year of available inventory information for all categories. Because of the heavy concentration of industry, the distribution of emissions is somewhat different than the overall distribution for the entire nonattainment area. These charts are shown in Appendix K, Figure 2.

Chart 4.2a

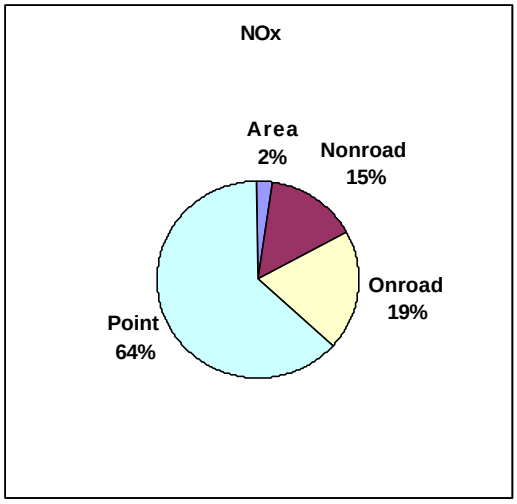
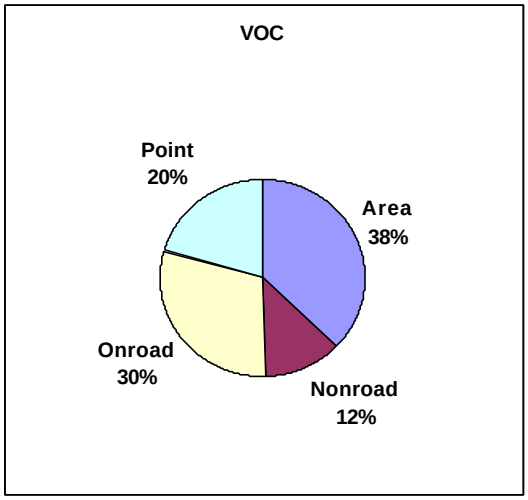
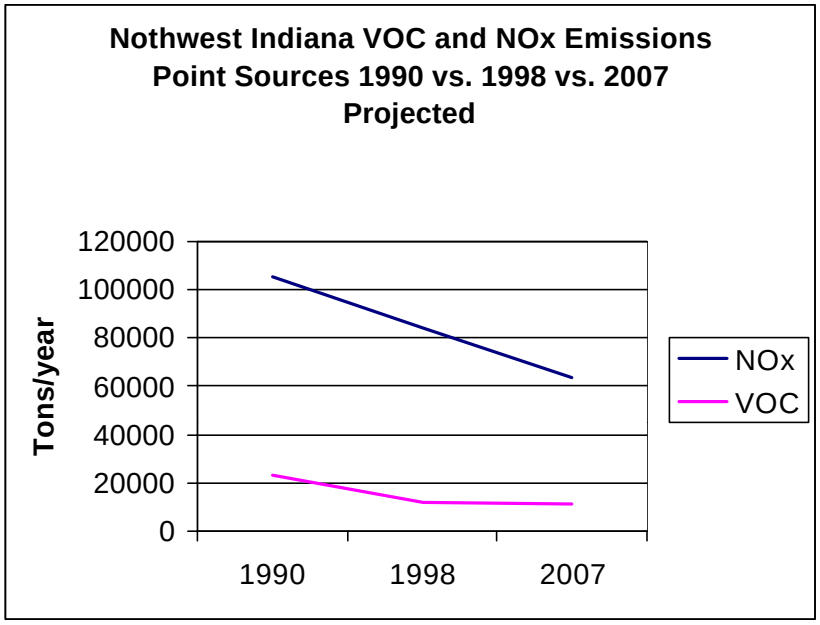


Chart 4.2b



As a result of the various control strategies implemented by IDEM, such as the Federal Clean Air Act controls, State Rate of Progress plans, and Tier II/low Sulfur program (these measures are detailed in Section 3 of this document), emissions have declined significantly. Chart 4.3 compares the point source emissions between 1990 and 1998 for both VOC and NO_x, with projections for 2007.

Chart 4.3



Appendix M describes the composition of the inventory, its derivation, and quality assurance measures taken with the inventory. The Grid M modeling area inventory described in Appendix K originated with OTAG and has been greatly enhanced by the efforts of the LADCO states. Through the LADCO organization, an extensive amount of effort has been made to coordinate the inventory activities between the states.

4.3 Modeling Analysis

The LADCO states have spent most of the last decade developing expanded monitoring networks and emission inventories for the nonattainment area. During that time, there were numerous ozone episodes over widespread areas. During many of these episodes, additional studies were undertaken to obtain specific types of information such as ozone precursor pollutants, upper air meteorology, and upper air pollutant concentrations. As a result, there were many candidate episodes in which there were relatively large amounts of monitored data to correlate to modeling studies. Four separate episodes were identified for which the model's performance could be well established.

Early efforts for LADCO, as well as other areas in the eastern United States, showed that controls solely in the nonattainment area were not sufficient to show attainment. It was evident that ozone and precursor pollutant levels coming into the area needed to be reduced. The LADCO states actively participated in the resulting OTAG study. LADCO was the Midwest modeling center for this study. Subsequent to the OTAG study and the issuance of the US EPA NO_x SIP Call, additional inventory and modeling efforts have taken place, culminating in the modeling used for this attainment demonstration. This modeling evaluated a variety of control strategies that the LADCO states identified in discussions. Strategy Runs SR8 – SR17 are detailed in Table 4.2 at the end of this chapter and Appendices I and J.

Appendices I (TSD Summary), and J provide detailed information of the modeling. This includes plots of modeled vs. actual hourly concentrations, tables of statistics, and maps showing spatial patterns. **The following conclusions can be drawn from this modeling:**

- **Basecase performance of the model meets EPA performance criteria**. Day-to-day and hour-to-hour variations of modeled and measured ozone concentrations are comparable. Spatially, areas of high measured concentrations correspond with modeled concentrations. There is some underestimation of peak values.

- **The model is considered a valid tool with which to evaluate ozone control strategies**. As a result of the basecase performance tests, eighteen exceedance days were selected upon which to evaluate the effects of various control strategies.

- **Attainment is shown by controls presented in this attainment demonstration**, which include Federal Clean Air Act controls, Rate-of-Progress plans, Tier II vehicles/Low Sulfur fuel program, and a multi-state NO_x control strategy of at least 0.25 lb/MMBtu for

utilities and corresponding large non-utility controls. These controls correspond to Strategy Run (SR) 13.

4.4 Attainment Test Results

USEPA's current guidance allows two attainment tests: a deterministic test and a statistical test. An additional analysis, a relative attainment test, was also performed. The first attainment test, the deterministic test, is a simple, conservative method of assessing attainment. In this test, all cell values must be < 125 ppb for all days. This test was not passed using any of the control strategies identified by the LADCO states.

The statistical test permits occasional exceedances and therefore reflects an approach more comparable to the form of the 1-hour NAAQS. A control strategy meets this test if the three following benchmarks are passed.

Benchmark 1 requires that the number of days with modeled exceedances in each grid cell must be less than 3 and any modeled exceedance must occur on a "severe" day. For each strategy except SR1, the modeled exceedance days all occur on severe days.

Benchmark 2 requires that the maximum modeled concentration on severe days shall not exceed 130 - 160 ppb, depending on the "severity" of the meteorological conditions. The number of days with modeled concentrations greater than the allowed value is shown.

Benchmark 3 requires that the number of grid cells > 125 ppb must be reduced by 80% on each severe day. The number of days the 80% criteria is not met are shown.

Following are the results of LADCO's strategy runs 1 and 8-17 with respect to these tests. A brief description of the control strategies that were included in each of these strategy runs is summarized in Table 4.2, and a more detailed description is included in Appendix J in Table 4.

Benchmark 1 (Pass if < 3)

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
3	2	2	1	1	1	1	1	1	1	1

Benchmark 2 (Pass if = 0)

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
5	**1**	**1**	**1**	**1**	0	0	0	0	0	0

Benchmark 3 (Pass if = 0)

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
6	0	0	0	0	0	0	0	0	0	0

These results indicate that:

(1) SR1, which does not pass any of the benchmarks, is not sufficient to provide for attainment;

(2) SR8 – SR11 come close to showing attainment, but appear to fall just short; and

(3) SR 12 – SR17, which meet all three benchmarks, are sufficient to provide for attainment.

To supplement the model-based attainment tests, an additional analysis was performed, a relative attainment test. This uses the observed design values together with the modeling data - i.e., the change in ozone concentrations between the base year and a given strategy. To show attainment, the resulting model-adjusted design value must be below the ozone NAAQS. For sites with current, observed design values above the NAAQS, the results are:

Site	Obs. D.V.	SR1	SR8	SR13	SR14	SR15	SR16	SR17
Pleasant Prairie	**131**	**126**	116	115	114	114	113	113
Milwaukee-Bayside	**128**	123	116	115	114	114	113	113
Harrington Beach	**127**	123	113	112	111	112	110	109
Sheboygan	**125**	121	112	111	109	110	108	108
Manitowoc	**127**	121	112	111	109	110	108	108
Michigan City	**140**	**132**	**125**	124	121	122	117	117
Holland	**133**	**127**	121	120	117	119	117	117
Muskegon	**132**	**126**	120	118	117	118	117	117
Unmonitored (mid-Lake)	**140**	**132**	**126**	124	123	124	122	122

These results were consistent with those of the statistical attainment test. SR13, which assumes a maximum NO_x emission rate of 0.25 lb/mmBTU for electric generating units in Indiana, Illinois, and Wisconsin, meets the statistical and relative attainment tests. This is the rate included in Indiana's state NO_x rule, along with additional controls on large industrial boilers. Further details on the modeling and assumptions made for SR13 are included in the TSD (Appendix J).

TABLE 4.1

Number of Exceedances at each site and design value for site, if > 125 parts-per-billion (ppb)

	Number of Exceedances						Design Value			
ILLINOIS	1995	1996	1997	1998	1999	2000	95-97	96-98	97-99	98-00
Zion		2		1						
Libertyville										
Deerfield										
Northbrook										
Cary										
Elgin										
Des Plaines		1								
Evanston	2			1						
Chi-Truman										
Chi-Taft										
Univ. of Chi	2		1							
Chi-SE Police										
Museum SI										
Chi-SWFP	2						127			
Chi-Jardine	2									
Chi-CTA										
ChiSears Tower										
Alsip	1									
Calumet City	1									
Cicero										
St. Lockport										
Lisle										
Lemont										
Braidwood										

	Number of Exceedances						Design Value			
INDIANA	1995	1996	1997	1998	1999	2000	95-97	96-98	97-99	98-00
LaPorte			1		1					
Michigan City	6	3	1		1		146	128		
Hammond	1	1								
Ogden Dunes	1	1		1	1					
Gary-IITRI										
Lowell										
Natl Lakeshore				1	1					
Potato Creek										
South Bend										
Granger						1				
Bristol										
Valparaiso										

TABLE 4.1 (continued)
Number of Exceedances at each site and design value for site, if > 125 parts-per-billion (ppb)

	Number of Exceedances						Design Value			
MICHIGAN	1995	1996	1997	1998	1999	2000	95-97	96-98	97-99	98-00
Frankfort		1								
Scottville	3	2			1	1				
Muskegon	4	1			1	1	136			
Holland	4	1			1	1	137			
Jenison	2	1								
Grand Rapids	1	2								
Parnell/Evans	1	2								
Coloma	1	2		2	1			125		
Cassopolis										
Kalamazoo										
Traverse City										

	Number of Exceedances						Design Value			
WISCONSIN	1995	1996	1997	1998	1999	2000	95-97	96-98	97-99	98-00
Pleasant Prairie	4	2	1	2	2		129	136	126	126
Kenosha			1							
Lake Geneva										
Racine		2	1	1				129		
S Milwaukee	2		2		1		126			
Milw-Alverno	1									
UWM-N		1	1		1					
Milw-App Ave	1									
Bayside	2	1	1	2	1		126	129	129	
Waukesha										
Grafton			2	1	1				128	
Slinger	1									
Harr. Beach	2	1	3	1	1		126	129	134	
Sheboygan	1	2	2	2				130	132	130
Manitowoc	1	2	2	1	1		126	128	128	
Kwaunee	1		1							
Newport Beach	1	1	2				127			
Milton										
Beloit										
Collins	1		1							
Green Bay										
Jefferson										
Mayville										
Columbus										
Madison										
Devils Lake										
Appleton	1									
Oshkosh										
Fond du Lac										
Popple River										
Harshaw										
Lake Dubay										
Wildcat Mtn.										

The Strategy Runs are described below. These runs are titled SR1and SR8 through SR17. The strategies build upon one another. The basis for all runs is the 1996 inventory that includes controls that were effective at that time. These were generally controls required by the 1990 Clean Air Act.

Base Case NO_x Controls

Point source controls include Title IV Phase 1 controls for utilities, and controls necessary to meet Reasonably Available Control Technology(RACT) requirements for major non-utility sources in non-waiver areas. The non-waiver area is in the center of the nonattainment area. Early modeling indicated NO_x RACT controls actually lead to an increase in local ozone levels and the states received a waiver of NO_x RACT requirements for this area. For non-road and other area source categories, Federal Reformulated Gasoline (RFG) – Phase 1 in mandatory areas was assumed. For motor vehicles, Federal RFG – Phase 1, enhanced vehicle Inspection and Maintenance (I/M), and Basic I/M, all in mandatory areas, was assumed.

Base Case VOC Controls

Controls for utility and non-utility sources included Control Technology Guideline (CTG) and Non-CTG RACT at major sources in nonattainment areas and New Source Review (NSR) - Lowest Achievable Emission Rates (LAER) and Offsets in nonattainment areas. VOC reductions for non-road / other area sources and motor vehicles were calculated from the same controls as for NO_x.

Strategy Run 1 (SR1)

This is the first strategy run with projected emissions and controls to be in place in 2007. It builds upon the 1996 basecase and adds Clean Air Act controls that were not in effect in 1996.

For NO_x, the following controls are added to point sources:

Utilities

- Title IV controls (Phases 1 and 2 for all boiler types)
- 250 tons per year PSD and New Source Performance Standards (NSPS) controls
- RACT and NSR limits in non-waiver areas

Non-Utilities

- RACT at major sources in non-waiver areas
- 250 tons per year PSD and NSPS controls
- NSR in non-waiver areas.

The following non-road / other area source controls were added:

- Federal Phase II small engine standards
- Federal Marine engine standards
- Federal Heavy Duty Vehicle (HDV) ($\geq$50hp) standards - Phase 1
- Federal RFG – Phase II in mandatory areas
- Federal locomotive standards, including rebuilds
- HC engine 4 gm standard.

The following motor vehicle controls were added:
- Tier 1 Light Duty Vehicle (LDV) and HDV standards
- Federal RFG – Phase II in mandatory areas
- Enhanced I/M in mandatory areas
- Basic I/M in mandatory areas
- Clean Fuel Fleets in mandatory areas
- National Low Emitting Vehicle (LEV) program
- HDV 3 gm standard.

For **VOC**, the following controls were added to the basecase:
Utilities and non-Utilities were modeled the same as for the 1996 basecase.

The following non-road / other area source controls were added:
- Federal Phase II small engine standards
- Federal Marine engine standards
- Federal HDV (≥50hp) standards - Phase 1
- Federal RFG – Phase II in mandatory areas
- Commercial / Consumer Solvent and architectural coating controls
- Stage I and II in nonattainment areas
- Autobody, degreasing, and dry cleaning controls in nonattainment areas.

The following motor vehicle controls were added:
- Tier 1 LDV and HDV standards
- Federal RFG – Phase II in mandatory areas
- Enhanced I/M in mandatory areas
- Basic I/M in mandatory areas
- Clean Fuel Fleets in mandatory areas
- 9.0 RVP gasoline elsewhere in domain.

Strategy runs SR8 through SR17

These runs are also projected to 2007. **VOC** controls remain the same as SR1 with the exception that motor vehicle controls have included reductions for Tier II vehicles and Low Sulfur gasoline for all the runs. NO_x non-road / other area sources and motor vehicle controls also remain the same as SR1, also with the inclusion of Tier II/Low Sulfur.

The major differences in these runs are the NO_x control strategies. State rules have evolved over time to meet court decisions and resulting policy changes and the runs reflect these changes. The basis for most of these is SR1, the Clean Air Act requirements. Table 4.2 shows the NO_x control changes.

TABLE 4.2

SR8

Utilities at SR1 + 0.25 lb/MMBtu (IL, IN, WI, KY, MO, TN) and MI state rule.
Non-utilities at SR1 + MI state rule.

SR9

Utilities at SR1 + 0.20 lb/MMBtu (IL, IN, WI), 0.25 lb/MMBtu (KY, MO, TN) and MI state rule.
Non-utilities at SR1 + MI state rule.

SR10

Utilities at SR1 + 0.20 lb/MMBtu (IL, IN, WI), 0.25 lb/MMBtu (KY, MO, TN) and MI state rule.
Non-utilities at SR1 + SR12 (IL, WI) and state rule (MI, IN).

SR11

Utilities at SR1 + 0.15 lb/MMBtu (IL, IN, WI), 0.25 lb/MMBtu (KY, MO, TN) and MI state rule.
Non-utilities at SR1 + SR12 (IL, WI) and state rule (MI, IN).

SR12 *(SIP Call)*

Utilities at 0.15 lb/MMBtu in 22 affected states.
Non-utilities at 60% large boilers, turbines, 90% large stationary internal combustion engines, and 30% large cement plants.

SR13

Utilities at SR1 + 0.25 lb/MMBtu (IL, IN, KY, TN) and state rule (MI, MO, WI).
Non-utilities at SR1 + state rule (MI, IN).

SR14

Utilities at 0.15 lb/MMBtu in 20 affected states and state rule (WI, MO).
Non-utilities at 60% large boilers, turbines and 30% large cement plants.

SR15 *(Similar to SR13 with updated emissions data and controls)*

Utilities at SR1 + 0.25 lb/MMBtu (IL, IN, KY, TN) and state rule (MI, MO, WI).
Non-utilities at SR1 + state rule (MI, IN).

SR16 *(Similar to SR14 with updated emissions data and controls)*

Utilities at 0.15 lb/MMBtu in 20 affected states and state rule (WI, MO).
Non-utilities at 60% large boilers, turbines and 30% large cement plants.

SR17

Utilities at 0.15 lb/MMBtu in 21 affected states and state rule (WI).
Non-utilities at 60% large boilers, turbines and 30% large cement plants.

TABLE 4.3

DATE 00/09/07 EPA AEROMETRIC INFORMATION RETRIEVAL SYSTEM (AIRS)
AMP450 AIR QUALITY SUBSYSTEM
QUICK LOOK REPORT

OZONE (44201) INDIANA UNITS: 007 PPM
OZONE SEASON: APR 01 TO SEP 30

SITE ID	P O C	M T	CITY	COUNTY	ADDRESS	YR	REP ORG	*NUM *MEAS	NUM REQ	VALID DAILY 1-HR MAXIMUM ---------MAXIMA---------- 1ST	2ND	3RD	4TH	VALS>.125 * MEAS	EST *	MISS DAYS ASSUMED < STANDARD	METH
18-127-0020	1	C		PORTER	INDIANA DUNES N	89	815	133	183	.086	.082	.080	.079	0	0.0	7	014
18-127-0020	1	C		PORTER	INDIANA DUNES N	90	815	145	183	.130	.120	.115	.113	1	1.2	10	014
18-127-0020	1	C		PORTER	INDIANA DUNES N	91	815	142	183	.134	.123	.122	.110	1	1.3	3	014
18-127-0020	1	C		PORTER	INDIANA DUNES N	92	815	166	183	.127	.113	.109	.098	1	1.1	7	014
18-127-0020	1	C		PORTER	INDIANA DUNES N	93	815	165	183	.104	.099	.086	.082	0	0.0	4	014
18-127-0020	1	C		PORTER	INDIANA DUNES N	94	815	167	183	.122	.103	.101	.094	0	0.0	8	000
18-127-0020	1	C		PORTER	INDIANA DUNES N	95	815	164	183	.116	.116	.112	.110	0	0.0	5	053
18-127-0020	2	3		PORTER	INDIANA DUNES N	98	001	182	183	.133	.121	.103	.102	1	1.0	0	047
18-127-0020	2	3		PORTER	INDIANA DUNES N	99	001	182	183	.125	.116	.115	.112	1	1.0	1	047
18-127-0024	1	2		PORTER	WATER TREATMENT	89	001	182	183	.113	.112	.108	.108	0	0.0	1	014
18-127-0024	1	2		PORTER	WATER TREATMENT	90	001	182	183	.126	.097	.094	.088	1	1.0	1	019
18-127-0024	1	2		PORTER	WATER TREATMENT	91	001	180	183	.116	.106	.105	.101	0	0.0	1	056
18-127-0024	1	2		PORTER	WATER TREATMENT	92	001	181	183	.135	.120	.116	.103	1	1.0	1	056
18-127-0024	1	2		PORTER	WATER TREATMENT	93	001	178	183	.098	.089	.087	.086	0	0.0	1	000
18-127-0024	1	2		PORTER	WATER TREATMENT	94	001	182	183	.117	.116	.112	.104	0	0.0	0	056
18-127-0024	1	2		PORTER	WATER TREATMENT	95	001	173	183	.131	.123	.122	.118	1	1.1	1	047
18-127-0024	1	2		PORTER	WATER TREATMENT	96	001	182	183	.159	.132	.124	.109	2	2.0	1	047
18-127-0024	1	2		PORTER	WATER TREATMENT	97	001	174	183	.122	.122	.108	.105	0	0.0	0	047
18-127-0024	1	2		PORTER	WATER TREATMENT	98	001	177	183	.128	.120	.112	.103	1	1.0	1	047
18-127-0024	1	2		PORTER	WATER TREATMENT	99	001	183	183	.125	.121	.115	.114	1	1.0	0	047
18-127-0026	1	3	VALPARAISO	PORTER	VALPARAISO WATER	98	001	127	183	.132	.100	.099	.099	1	1.4	1	047
18-127-0026	1	3	VALPARAISO	PORTER	VALPARAISO WATER	99	001	171	183	.106	.106	.106	.104	0	0.0	1	047

5. COMMITMENT TO CONDUCT A MID-COURSE REVIEW

On February 21, 2000, IDEM submitted a letter to US EPA supplementing the Phase II Attainment Demonstration submittal dated December 16, 1999. As part of that submittal, the State of Indiana committed to conduct a mid-course review of the ozone attainment plan for Lake and Porter Counties. This mid-course review will include a reassessment of the modeling analyses and more recent monitoring and emissions data to determine if the control strategy included in this Attainment Demonstration is resulting in the level of emission reductions and air quality improvements needed to attain the ambient air quality standard for ozone. Given the difficulty inherent in predicting emission levels more than a few years into the future, it is prudent to plan for this type of mid-course check.

US EPA originally indicated that the review should be conducted in 2003, when anticipated NO_x controls were to have been implemented. However, on August 30, 2000, the DC Circuit Court of Appeals postponed the compliance date of the NO_x SIP Call from May 1, 2003 to May 31, 2004.

With the extension of the SIP Call compliance date, IDEM will work with LADCO and the other Lake Michigan states to conduct an interim review in a more feasible time-frame to fully assess the efficacy of the regional controls, which for some states will not be implemented until 2004. IDEM believes the interim review should not be conducted prior to December 2005, after at least one full season of regional NO_x controls are in effect. IDEM will continue to work with the other Lake Michigan States, LADCO, and US EPA to determine a date for conducting the interim review.

6. MOBILE SOURCE EMISSIONS BUDGETS FOR LAKE AND PORTER COUNTIES

6.1 Introduction

This portion of the document outlines the mobile source emissions budgets for Lake and Porter Counties, and provides a detailed description of how the budgets were established. The purpose of the mobile source emission budgets is to establish transportation conformity. IDEM submitted mobile source emissions budgets to US EPA in February of 2000 to comply with requirements specified in US EPA's proposed rulemaking to conditionally approve the Attainment Demonstration for Lake and Porter Counties, Indiana (64FR70514, December 16, 1999). US EPA issued a finding of adequacy concerning IDEM's February 2000 mobile source emission budget submittal on June 20, 2000 (65 FR 38277). The budgets are consistent with the mobile source emissions inventories that were used in the attainment demonstration modeling. The emissions budgets outlined below are consistent with those that were submitted to US EPA in February of 2000, with one exception, the application of US EPA MOBILE5 Information Sheet #8 *Tier II Benefits Using Mobile 5*, which was not released until April 2000.

6.2 Mobile Source Emissions Budgets For Transportation Conformity

Table 6.1
2007 Emissions Budgets

	Tons Per Summer Day	Pounds Per Summer Day	Grams Per Summer Day
VOC	9.40	18,793	8,524,572
NO_x	24.29	48,573	22,032,344

6.3 Emission Factors

The US EPA MOBILE 5b emission factor model was used to establish the mobile source emissions budgets for Lake and Porter Counties. The Northwestern Indiana Regional Planning Commission (NIRPC), the MPO for Lake and Porter Counties, uses MOBILE 5b for its conformity demonstrations as well.

An input file was created to reflect the area's climate and regulatory requirements. For instance, the MOBILE model requires that the minimum and maximum temperature and the parameters of a local vehicle inspection and maintenance program be set. The climate data that were used derived from the Midwestern Climate Center, which can be found at the following internet address:

http://mcc.sws.uiuc.edu/Summary/Data/128999.txt

The average high and low temperatures for the summer season were used to reflect the emissions for an average summer day. The regulatory requirements that are reflected in the MOBILE model include area-specific and national controls. These measures include reformulated gasoline, vehicle inspection and maintenance, the Federal Motor Vehicle Control Program, federal gasoline vapor pressure requirements, the National Low Emitting Vehicle (NLEV) rule, and the heavy duty diesel vehicle (HDDV) emission standards. The final two programs (NLEV and HDDV) are new to the mobile modeling and were included based on US EPA guidance. IDEM used the applicable information sheets published by the US EPA Office of Mobile Sources to include NLEV (Information Sheet # 6) and HDDV (Information Sheet #5) in the modeling process.

Information Sheet #8 *Tier II Benefits Using Mobile 5* (April 2000) was applied to the emissions calculations and was the final step in the process. The reduction factors provided by the US EPA in Tables 3 and 6 (final I/M and reformulated gasoline reduction factors) of the information sheet were applied to the applicable VMT calculations to derive the appropriate emissions to be deducted from the emissions budget. The following table illustrates the emissions reductions associated with tier II standards and low sulfur fuel:

Table 6.2

2007 Mobile Source Emissions
Pounds Per Average Summer Day

	Original Emissions	Emissions w/Tier II LS	Difference	Diff%
VOC	19,800	18,800	1,000	5.05%
NO_x	55,240	48,580	6,660	12.06%

Appendix L represents the MOBILE input file for 2007.

6.4 Transportation Data and Growth Projections

The core 1995 and 2007 mobile source emissions inventory data derive from NIRPC=s EMME/2 travel demand model. The data for these years include vehicle miles traveled (VMT), vehicle speed, and limited vehicle classification information on a link-by-link basis. For reasons pertaining to the Attainment Demonstration and Rate-of-Progress requirements under the Clean Air Act, these data were interpolated for the 1996, 1999, 2002, and 2005 milestone years, and extrapolated to the 1990 base year.

NIRPC's fleet mix data were divided into only three vehicle classes:
- Light duty vehicles (LDV)
- Light duty trucks (LDT)
- Heavy duty vehicles (HDV)

US EPA currently uses eight vehicle types for emissions estimates:
- Light duty gasoline vehicle (LDGV)
- Light duty gas truck 1 (LDGT1)
- Light duty gas truck 2 (LDGT2)
- Heavy duty gas vehicle (HDGV)
- Light duty diesel vehicle (LDDV)
- Light duty diesel truck (LDTT)
- Heavy duty diesel vehicle (HDDV)
- Motorcycle (MC)

The data provided by NIRPC were apportioned to each of the eight US EPA types based upon Highway Performance Monitoring System (HPMS) data received from INDOT for fleet mix by roadway type. It was assumed that LDV contained LDGV, LDDV and MC; LDT contained LDGT1, LDGT2 and LDDT; and HDV contained HDDV and HDGV. The INDOT data were first aggregated into the three vehicle types used by NIRPC: HDV, LDV, LDT. Then by applying the percent of the LDGVs in the LDVs, the percent of LDGVs could be estimated for any link. For instance, link 10151076 has LDVs at 35.8%, by applying the conversion generated from the INDOT data it can be found that LDGVs comprise 35.4% of the LDVs at this link. By using this methodology the three vehicle types reported for each link can be broken out by roadway facility type.

6.5 Emissions Calculation

After producing the emission factors using MOBILE 5b, and apportioning the VMT to each vehicle classification, the emissions were calculated using Microsoft Access. The emission factors were assigned to each link based upon the reported speed and vehicle classification. The product of the emission factor and the VMT is the emissions for a given vehicle classification at a specific link.

6.6 Link Between Mobile Source Emissions Budgets and the Attainment Demonstration

The transportation conformity budgets outlined above are based on the same inventory information (VMT, fleet mix, speeds, etc.) that was used in the UAM modeling for the attainment demonstration. In addition, the control measures that were factored into the UAM modeling inventory are consistent (identical) to those that were factored into the emissions budgets contained in this document.

6.7 Release of MOBILE6

IDEM commits to recalculate and resubmit the conformity budgets contained in this document within one year of the release of the MOBILE6 emissions factor model.

7. CONCLUSION

Indiana has worked for more than two decades to improve air quality in Northwest Indiana with the goal of achieving attainment of the ozone standard. Through advances in technology and regulatory programs, there have been significant reductions in ozone-causing pollutants in the entire Lake Michigan region. This document represents the final step in the planning process for achieving the ultimate goal of attainment.

Monitored air quality in the nonattainment area has shown steady decreases in ozone as a result of control strategies implemented by Indiana and the other LADCO states since 1990. Currently, Indiana does not have any monitoring sites with a design value over 121 ppb. It is clear that NO_x and VOC emission reductions in the last decade have had a positive effect on ozone levels. However, since the area is impacted by ozone transport from upwind areas, it is also clear that additional local control measures cannot, by themselves, bring the area into attainment. Regional modeling performed by LADCO shows that attainment could be achieved through regional NO_x controls. Part of this attainment demonstration is the adoption of a state NO_x rule that, in addition to regional NO_x reductions of at least the same level represented by SR13 and as well as other controls detailed herein, will allow the nonattainment area to meet the ozone standard by 2007. Indiana is also in the process of adopting a NO_x SIP Call compliant rule that, along with similar reductions in other states, would allow the nonattainment area to meet the ozone standard. This rule is scheduled to be promulgated by mid-2001. The LADCO modeling of the NO_x reductions and all the other planned control measures support these conclusions. Therefore, Indiana requests US EPA approval of this Attainment Demonstration for the Indiana portion of the Chicago Severe Ozone Nonattainment Area.